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## GENERAL DATA OF STATE ACADEMIES

Academies of Sciences.	Members	Annual Dues	Annual State Appropriation	Salary of Officers	Annual Pages of Publications	Interest
California .....	300±	\$ 6.00	No data given			
Colorado .....	142	10.00	None	\$600	110±	"Apathetic during war, but now interest is reviving."
Connecticut .....	172	5.00	From private funds, \$1,530	None	450	"Lively interest in publications, but a decided lack of interest in the meetings."
Florida .....	88	1.00	None	None	None	"Dead"
Illinois .....	314	1.00	\$1,000	None	345±	"More lively than apathetic"
Indiana .....	231	1.00	\$700	None	475	"Good and getting better"
Iowa .....	350	1.00	Printing	None	550-600	"Lively"
Kansas .....	173	1.00	\$1,300	\$1,000	400	"Rather apathetic"
Kentucky .....	96	1.00	None	None	None	"Fairly lively"
Michigan .....	208	1.00	Printing	\$75	300-400	"Interest reviving"
Nebraska .....	73	1.00	\$150	None	75	"Lively interest at the annual meeting, but apathetic the remainder of year"
New Mexico .....	25	.50	None	None	None	
New York .....	624	10.00	From private funds, \$2,538	\$900	300-500	"Active"
North Carolina .....	80	1.00	None	None	125-150	"Very lively"
Ohio .....	258	1.50	From private funds, \$250	None		Fair
Oregon .....						"Long time dead"
Tennessee .....	75	2.00	None	None	50±	"60 per cent. alive"
Texas .....			No data given excepting			"Apathetic"
Utah .....	92	1.00	None	None	244 (1908-1917)	"Rather apathetic"
Washington, D. C. ....	518	5.00	From private funds, \$750	None	800	"Active"
Wisconsin .....	350	1.00	\$1,500	\$200	500	"About 50/50"
Wyoming .....						"Dead"
Philadelphia Acad. Nat. Sci. ....	458	10.00	From private funds, \$36,000	\$19,000	650	"Up to standard"
St. Louis .....	210	6.00	From private funds, \$650	\$900	200-300	"Majority apathetic"

state or private sources to publish articles of considerable scientific value which due to their extreme specialization, local or very general nature, would not be accepted by the current journals. If the academies have outlived their general usefulness they can still remain very influential in existing solely as publication centers for special articles.

The American Association for the Advancement of Science has recently proposed a plan in which it has invited the academies to affiliate with it. This is not only a very gracious act but one that may stimulate the academies to further and more important activities.

DAVID D. WHITNEY,  
President of the Nebraska  
Academy of Sciences, May  
1918, to May, 1919

October 15, 1919

### RESULTS OF THE TOTAL SOLAR ECLIPSE OF MAY 29 AND THE RELATIVITY THEORY<sup>1</sup>

THE results obtained at the total solar eclipse of May 29 last were reported at a joint meeting of the Royal and the Royal Astronomical Societies, held on November 6. The stations occupied were Sobral, in North Brazil, and Principe Island. Two cameras were employed at Sobral, the 13-in. objective of the Greenwich astrographic equatorial, and a 4-in. lens, of 19-ft. focus, lent, together with an 8-in. cœlost, by the Royal Irish Academy. It was realized before the expedition started that the cœlost was scarcely suitable for observations of such extreme precision as were required to detect and measure the

<sup>1</sup> From *Nature*.

small shift in the places of the stars that might be produced by the sun's attraction. War conditions, however, made it impossible to construct a suitable equatorial mounting, though it is hoped that this may be done before the eclipse of 1922.

The results, to some extent, but, fortunately, not entirely, justified these apprehensions. The eclipse plates taken with the 13-in. (stopped down to 8 in.) are out of focus. Since the focus was good on photographs taken at night a few hours earlier, and also on the check plates taken before sunrise in July, the explanation appears to be a change of figure of the cœlostast mirror, due to the heat of the sun. These plates were compared with the July check plates by using a duplex micrometer. They show an undoubted gravitational shift, the amount at the sun's limb being  $0.93''$  or  $0.99''$ , according to two different methods of treatment. The probable error, as estimated by the individual discordances, is about  $0.3''$ , but there is reason to suspect systematic error, owing to the very different character of the star-images on the eclipse and check plates. This instrument supports the Newtonian shift, the amount of which is  $0.87''$  at the limb. There is one mode of treatment by which the result comes out in better accord with those of the other instruments. Making the assumption that the bad focus did not alter the scale, and deducing this from the July plates, the value of the shift becomes  $1.52''$ .

The results with the 4-in. lens are much more satisfactory. The star-images are well defined, and their character is the same on the eclipse and check plates. As the duplex micrometer would not fit these plates, a key-plate, on which the film was placed away from the lens, was taken in July, and all the plates in turn were placed in contact with this plate and compared with it. The resulting shift at the limb is  $1.98''$ , with a probable error of  $0.12''$ . The values from the separate stars are in good accord, and they support the fact of the shift varying inversely as the distance from the sun's center; they are thus unfavorable to its being due to refraction, as was suggested by Professor Newall at

the meeting. Moreover, Professor Lindemann pointed out that the comets of 1880 and 1882 had traversed this region without giving the slightest evidence of having encountered resistance; as their speed was about 300 miles per second, a vivid idea is given of the extreme tenuity of any medium that they encountered.

The Principe expedition was less fortunate in the matter of weather, but a few plates showed five stars. Since no check plates of the eclipse field could be taken there, another field near Arcturus was photographed, and both it and the eclipse plates were compared with plates of the same fields taken at Oxford with the same object-glass. It was, moreover, necessary to assume that the scale of the eclipse plates was the same as that of the check plate. This is justified by the fact that the diurnal variation of temperature in Principe is only some  $4^{\circ}$  F., and that there had been no bright sunshine on the mirror before totality. The measures indicate a shift at the limb of  $1.60''$ , with a probable error of  $0.3''$ .

It will be seen that the mean of this result and that with the 4-in. at Sobral agrees very closely with Einstein's predicted value  $1.75''$ . It was generally acknowledged at the meeting that this agreement, combined with the explanation of the motion of the perihelion of Mercury, went far to establish his theory as an objective reality. Sir J. J. Thomson, who presided, spoke of the verification as epoch-making; he suggested that it would probably have a bearing on electrical theory, but he regretted the very complicated form in which Einstein expressed his theory, and hoped that it might be possible to put it into a form in which it would be more generally comprehensible and useful.

Dr. Silberstein laid great stress on the failure to confirm Einstein's third prediction, that of the displacement of lines in the sun's spectrum towards the red, to the amount of  $1/20$  Angström unit; this had not been verified, in spite of the careful search made by Dr. St. John and Mr. Evershed. As the probable error of the measures was much less than the quantity predicted, he looked on this

result as final; some people had suggested that the shift might be veiled by a systematic outward movement of the photosphere, but as Dr. St. John made measures both at the sun's center and limbs, that suggestion was not tenable. Professor Eddington admitted that the failure threw doubt on the validity of some of the steps which led Einstein to his gravitational result; but he contended that the two other successes indicated that the result was right, even if reached by a wrong method.

There was some discussion on Professor Lindemann's method of photographing stars in daylight by the use of red screens. However, the eclipse method seems more trustworthy, and the Astronomer Royal expressed the hope that the eclipse of 1922 might be observed with equatorials. The star-field is not so rich as in the late eclipse, but with longer exposure much fainter stars could be recorded. The eclipse-track crosses the Maldiv Islands and Australia, and is therefore fairly accessible.

A. C. D. CROMMELIN

### SCIENTIFIC EVENTS

#### INVESTIGATIONS ON INFLUENZA

THE Metropolitan Life Insurance Company has provided resources to carry on investigations into the cause, mode of transmission and treatment of influenza and its complications.

A commission has been appointed consisting of Dr. G. W. McCoy, director of the hygienic laboratory, U. S. Public Health Service; Dr. W. H. Park, director of the research laboratory, New York City Department of Health; Dr. Lee K. Frankel, third vice-president of the Metropolitan Life Insurance Company; Dr. A. S. Knight, medical director of the Metropolitan Life Insurance Company; Dr. M. J. Rosenau, chairman, professor of preventive medicine and hygiene, Harvard Medical School. Later, Professor E. O. Jordan, of the University of Chicago, and Dr. W. H. Frost, of the U. S. Public Health Service, were invited to join in the work.

Work has already been begun in Washington, New York, Boston and Chicago and may be extended to other places as occasion arises. In this way correlation and cooperation are effected. The object of the commission is primarily to study the cause, mode of spread and treatment of influenza and its complications. Studies are now being made upon the prophylactic value of vaccines against influenza, common colds and pneumonia, properly controlled. Laboratory researches are being conducted to determine the cause of these infections, and a special study is being made of the bacterial flora of the upper respiratory tract in health and disease. Special consideration is being given to the possibility of a filterable virus being the cause of any of these infections. Cooperation and suggestions have been invited from health officers and others interested.

#### PROBLEMS OF FOOD AND NUTRITION

THE National Research Council has formed a special committee on Food and Nutrition Problems, composed of a group of the most eminent physiological chemists and nutrition experts of the country. The members are: Carl Alsberg, chief, bureau of chemistry, Department of Agriculture; H. P. Armsby, director of the institute of animal nutrition, Pennsylvania State College; Isabel Bevier, director of department of home economics, University of Illinois; E. B. Forbes, chief, department of nutrition, Ohio Agricultural Experiment Station; W. H. Jordan, director, N. Y. Agricultural Experiment Station; Graham Lusk, professor of physiology, Cornell University Medical College; C. F. Langworthy, chief of office of home economics, Department of Agriculture; E. V. McCollum, professor of biochemistry, School of Public Health and Hygiene, Johns Hopkins University; L. B. Mendel, professor of physiological chemistry, Yale University; J. R. Murlin, professor of physiology and director of the department of vital economics, University of Rochester; R. A. Pearson, president of the Iowa State Agricultural College; H. C. Sherman, professor of food chemistry, Columbia University; A. E. Taylor, Rush professor